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FY 1999 - FY 2001

The economic operating efficiency of Reclamation water and power facilities can be improved through the adoption of lower cost, modularized, computer-based control systems in place of the undistributed SCADA (Supervisory Control and Data Acquisition) systems presently used at many of Reclamation's powerplants. Wide use of modularized SCADA systems will make it possible to lower overall life-cycle costs and more readily take advantage of new technology developments. Older systems suffer from built-in inflexibilities that prevent their being modified quickly or inexpensively to meet new needs or support new technologies. These inflexibilities have hampered the implementation of beneficial research results, such as hydroelectric generation optimization, at some of Reclamation's most economically promising facilities.

The primary goal of this research is to define and implement standards for modularized SCADA system configuration, management, and automated operation. In addition, standards are being developed and refined for graphics-based control definition and operation modules. Data collected from the SCADA systems and their automated operational modules will be examined and used to refine the performance of future modules. The ultimate objective is to facilitate the evolution of Reclamation's SCADA systems to more flexibly and economically support their associated projects.

During FY 1999, a module was developed to support management of a group of other SCADA system modules. The new module was tested and placed in operation at the Lower Colorado Dams Facilities Office (LCDFO). The module supports data correction and integrity checking between modules, as well as rudimentary health monitoring of all modules. A configuration standard was also completed during the year. The standard establishes a baseline organization for the complex data files necessary to allow SCADA modules to be integrated into a system. The standard is expected to reduce development and implementation time by simplifying configuration and allowing for improved reuse of code. During the last half of FY 1999, a graphics-based software package was secured which will be used for powerplant equipment control. This package supports the IEC 1131 standard for logic programming and has been adapted to function as a new SCADA system module. Programming efforts using this module are currently underway. Finally, a revised unit commitment package was developed and deployed at LCDFO during the year. This package provides a much improved algorithm for starting and stopping units under changing power system conditions while still performing hydroelectric generation optimization.

Bureau of Reclamation, Lower Colorado Dams Facilities Office
Bureau of Reclamation, Central Valley Operations Office
CH2M Hill, Inc.
Performance Software Associates, Inc.

Matuszczak, L. A. 1999. Database Manager Application User's Guide. Bureau of Reclamation, Hydroelectric Research and Technical Services Group.

King, B. G. and L. A. Matuszczak. 1999. Application DDBS Linkage Configuration File Standard. Bureau of Reclamation, Hydroelectric Research and Technical Services Group.

Skufca, F. L., and S. C. Stitt. 1999. Resource Optimization System (ROS) User's Manual. Bureau of Reclamation, Hydroelectric Research and Technical Services Group.

Other Deliverables:

Distributed Database Manager Module, Version 1.0
Resource Optimization System Module, Version 1.1